TechNote

ShoreTel/ShoreGear 14.2

November 9, 2015

XCAPI voiceoverIP

Introduction

This document is intended to support engineers with the integration of the latest XCAPI version into an existing ShoreTel/ShoreGear environment. Though being based on the version 14.2 (build 19.45.5101.0) of the ShoreTel/ShoreGear and XCAPI version 3.5.59 this document is also applicable to other versions with a few adjustments.

The following pages give essential information to allow optimal interworking of both the ShoreTel/ShoreGear and XCAPI. At this point we suppose that the ShoreTel/ShoreGear environment, the hardware and the operating system where XCAPI and the CAPI 2.0 application is running on, are properly installed and accessible through the IP network.

For detailed ShoreTel configuration procedures, please refer to the respective manufacturer documentations and manuals.

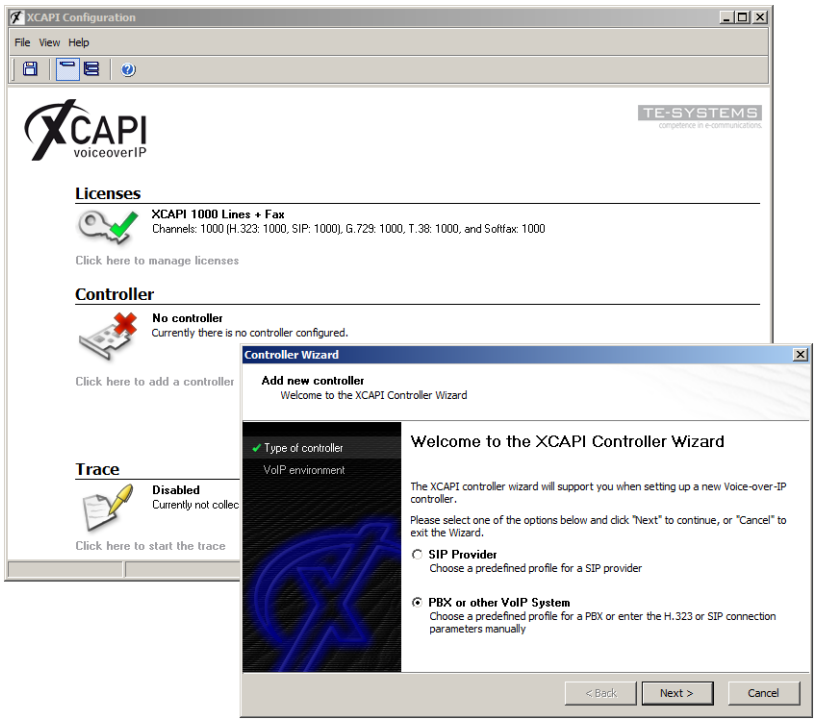
Additional XCAPI information and documents (TechNotes), e.g. Quick Starter Guide, License on demand, Fax Transmission, Virtual Hardware ID and VMware Virtual Machines can be found on our XCAPI Website within the community download section and on our YouTube channel.

XCAPI Configuration

Please start up the XCAPI configuration to create a new controller that will be assigned to the ShoreTel/ShoreGear SIP trunk. The ShoreTel/ShoreGear SIP trunk configuration is described from page 8.

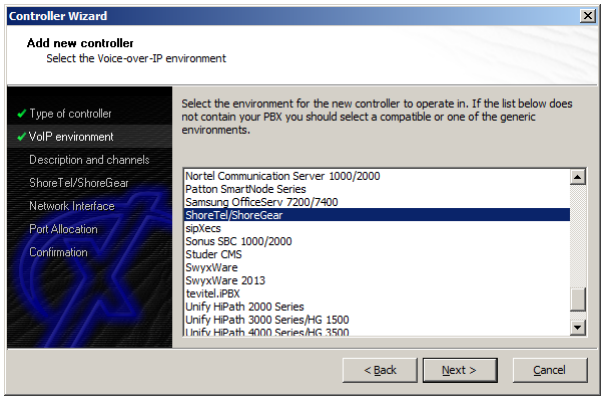
If you've just installed XCAPI and start the configuration tool for the first time, the XCAPI controller wizard will pop up automatically. This also happens if no controller is configured. To start up the XCAPI controller wizard on your own, just click the hyperlink labeled **Click here to add a controller** on the main page of the XCAPI configuration tool.

On the first controller wizard dialog, please select the **PBX or other VoIP System** and proceed with the **Next** button.



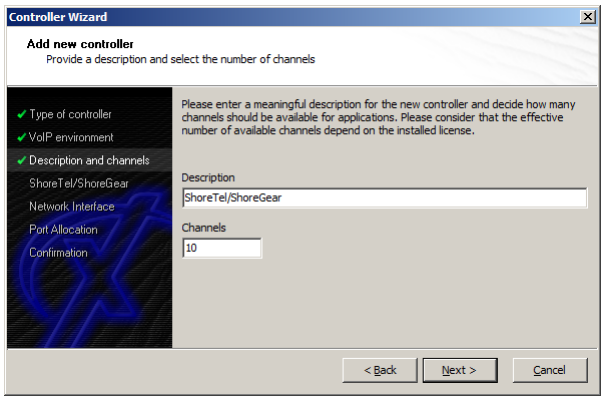
2.1 Voice over IP Environment

The next dialog of the configuration tool shows a list of some common Voice-over-IP environments. Selecting one of those will configure the XCAPI with a selection of near-optimal defaults for the kind of environment you have, saving you a lot of manual configurations.



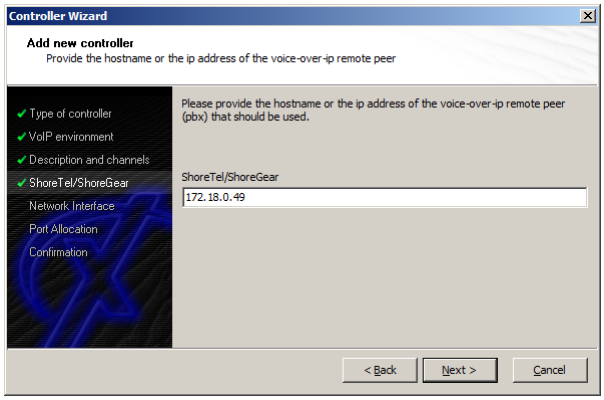
2.2 Description and Channels

This dialog allows you both to enter an appropriate controller name and set up the number of available and licensed channels. So please enter the amount of simultaneous channels XCAPI should provide when communicating with the ShoreTel and the CAPI 2.0 application.



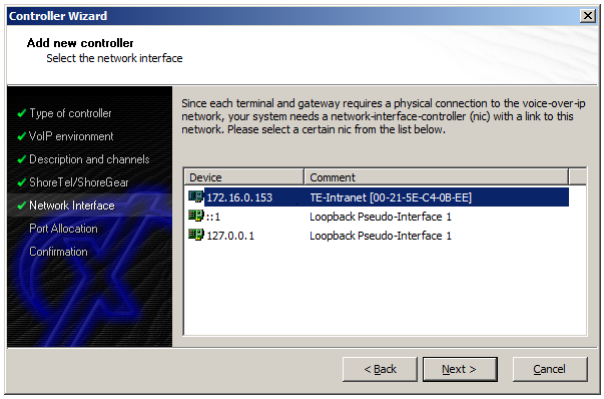
2.3 Gateway Address

Next, please provide the host name or the IP address of the SIP listening ShoreTel/ShoreGear Ethernet interface. Please note that the XCAPI controller and the ShoreTel/ShoreGear both use by default the UDP port 5060 for SIP signaling.



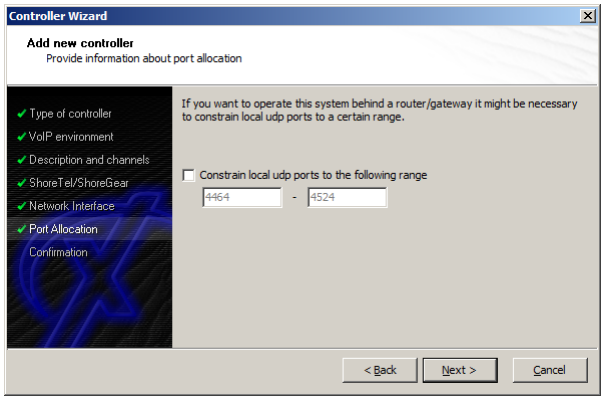
2.4 Network Interface

Select the network interface you want to connect to the newly created XCAPI controller.



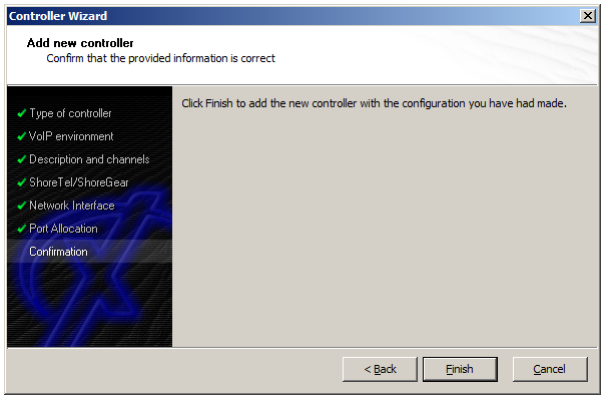
2.5 Port Allocation

On demand a UDP (RTP/T.38) port range can be specified. This port range will be used by the XCAPI controller towards the gateway. If the UDP port range has to be enabled for the local VoIP environment and routing behavior, please check with the **System Parameters / Security / Port Configuration** of the ShoreTel/ShoreGear.

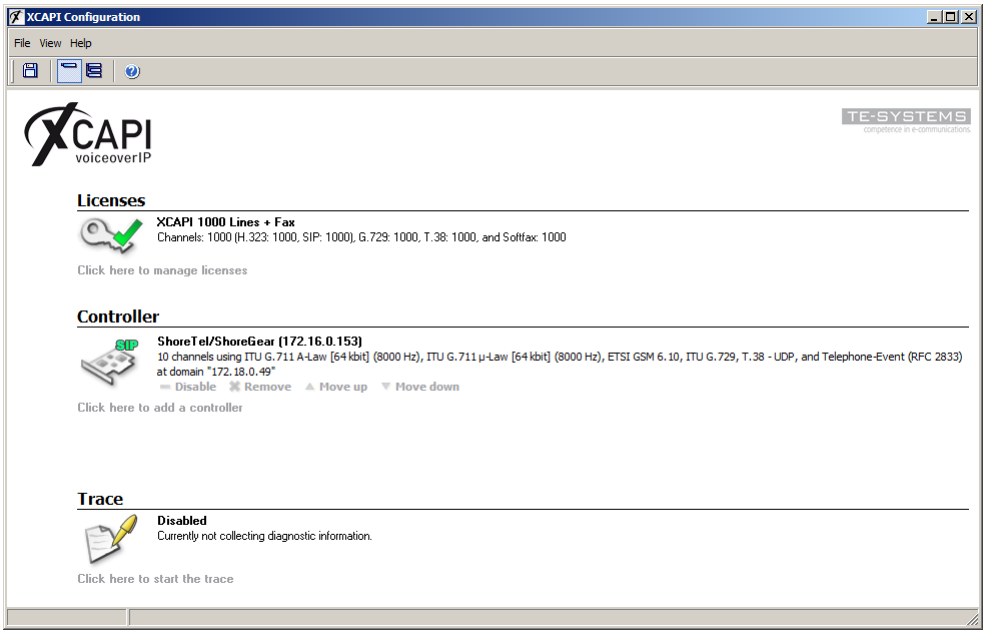


2.6 Confirmation

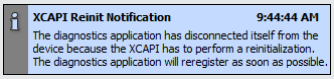
The final dialog of the controller wizard performs some checks on the configuration parameters you've made. When everything is correct, please use the **Finish** button in order to create the new controller.



Finally you can save the controller which is also listed on the main view of the XCAPI configuration.



The bound CAPI 2.0 application with its services must always be restarted to take effect on the XCAPI controller changes. Restarting any of the XCAPI services won't help at all.



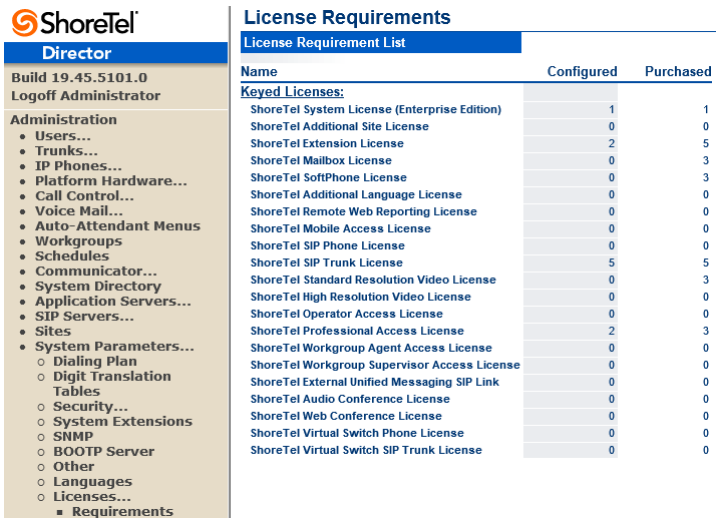
ShoreTel Configuration

In order to establish a connection between XCAPI and the ShoreTel/ShoreGear you need to setup XCAPI as SIP trunk with all its appropriate configurations. The next sections show a basic configuration which can't be used one-to-one in the customer environment. The according configuration dialogs have to be adjusted for the PBX environment and the CAPI application. Especially the dialing plan and its related trunk group settings (access codes, DID and DNIS mapping, trunk digit manipulation) must reflect the local circumstances.

Please check with the ShoreTel document **SIP Trunks API For 3rd-Party Developers** chapter 5 about known SIP trunk limitations. Additional services could be achieved with a ShoreTel **SIP Server** configuration and its advanced SIP server profile parameters.

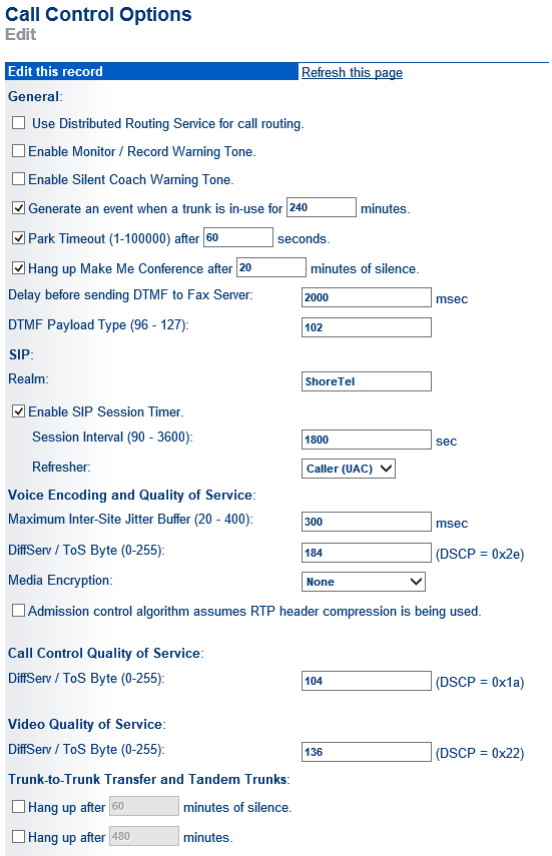
3.1 License Requirements

First, please ensure that the **ShoreWare SIP Trunk License** is suitable for SIP trunking. For this, please check the according license requirements/keys dialog.



3.2 Call Control Options

The call control options are used with their default values and should only be adjusted for interoperability reasons. Ensure that the SIP related parameters are set conform to the ones of the XCAPI controller.

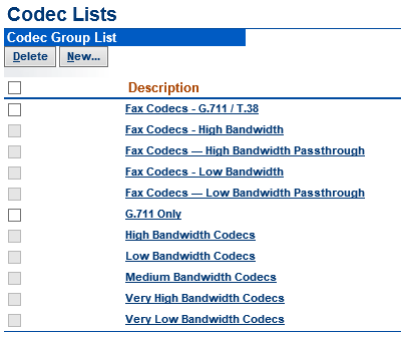


3.3 Build-in Capacity

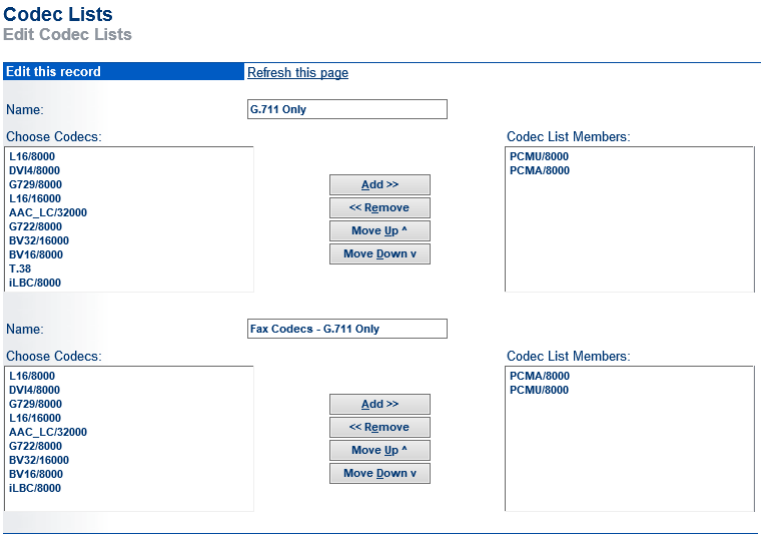
The **Voice Switch** requires optimal clock source and clock priority configurations. It's necessary that all layers are synchronized, especially for fax interworking. Wrong settings/priorities may lead to packetloss and facsimile abruption.

3.4 Codec Lists

Please ensure that the codec settings are set conform to your VoIP environment. The selected codecs must be also available for the XCAPI controller. For this test environment two custom codec lists (G.711 Only and Fax Codecs - G.711 Only) were added.

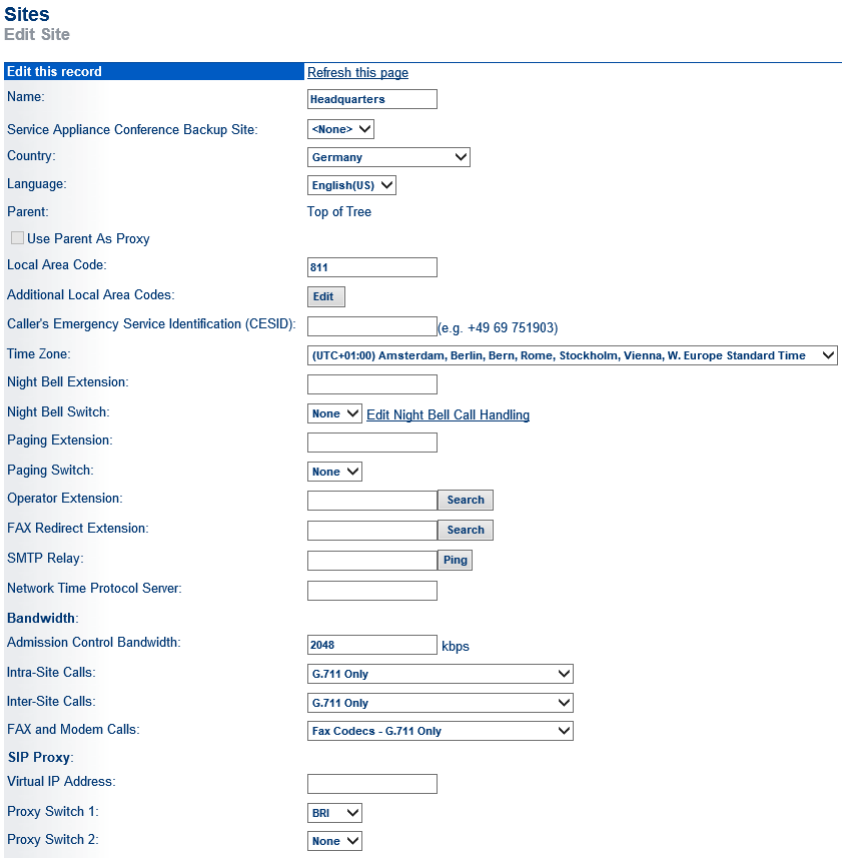


Both codec lists include **PCMA/8000** and **PCMU/8000** only and are assigned to **Intra-, Inter Site Calls** and **FAX and Modem Calls** as shown in the next chapter **Sites** starting on page 12.



3.5 Sites

Besides the geographical information, ensure that the environment is set to the required bandwidth (see **Admission Control Bandwidth**). As described in the previous **Codec Lists** chapter, this test environment uses the custom codec lists **G.711 Only** and **Fax Codecs - G.711 Only** for **Intra-, Inter Site Calls** and **FAX and Modem Calls**.
The other **Headquarter** Site settings are used as shown next.

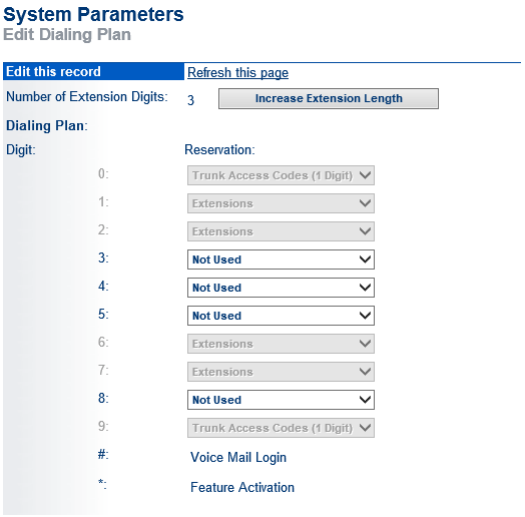


3.6 Dialing Plan

The dialing plan configuration is used as shown in the screenshot below. Digits **0** and **9** are set to **Trunk Access Codes (1 Digit)**.

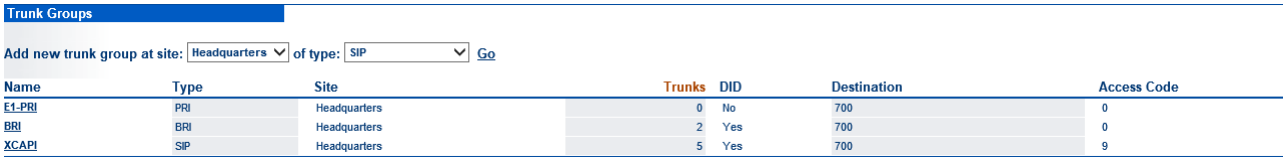
For this environment, digit **0** is used for accessing the PSTN whilst digit **9** is used for accessing the SIP trunk. Beside of the internal extensions, here allocated to digit 1, the **Off System Extensions** are reserved to digit **2**. To allow routing PSTN calls towards the SIP trunk, it is necessary to relate the numbering range of the SIP trunk to **Off System Extensions**.

More details about SIP trunking and off system extensions can be found in the chapter **Trunk Groups** starting on page 14.

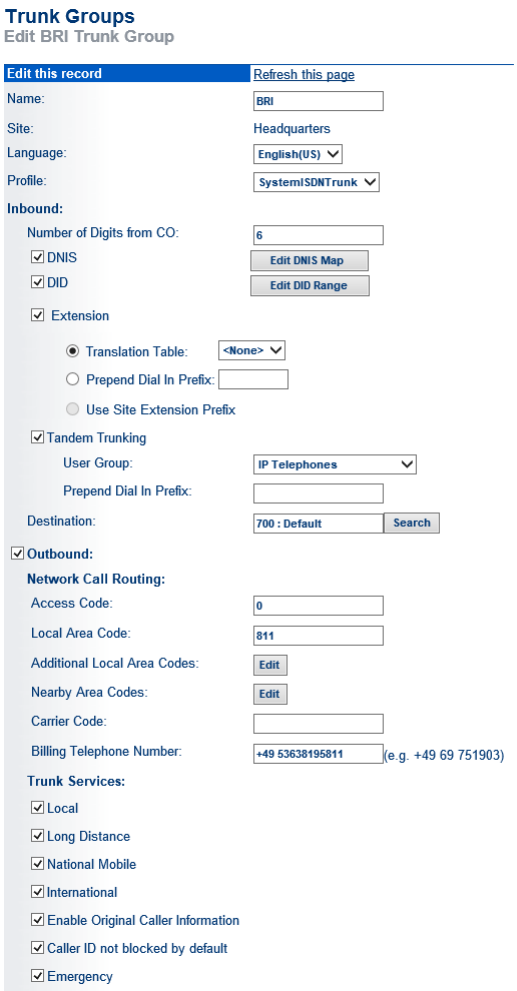


3.7 Trunk Groups

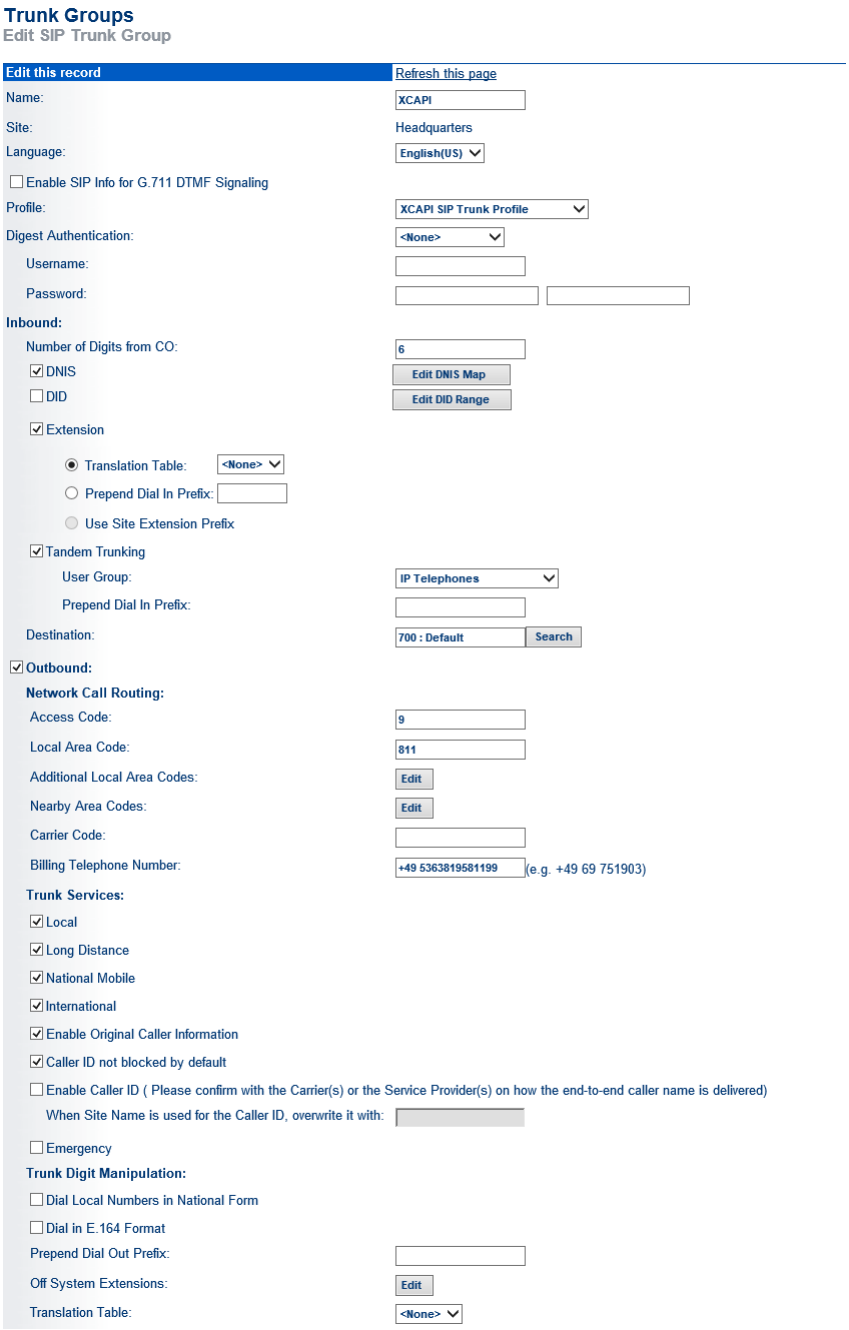
The trunk groups with their relations are used as shown next. The related **Individual Trunk Groups** will be described in the next chapter starting on page 17.



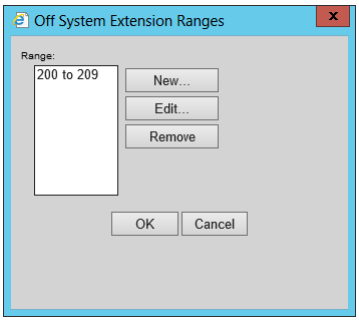
The BRI trunk group is used as shown below.



The mentioned number mapping of the dialing plan chapter is realized here via the **DNIS Map** of the BRI trunk group. In detail the number range **900** to **909** is mapped to the according off system extensions from **200** to **209**.
The **XCAPI** related SIP trunk is used here with **Access Code** number **9**. This is the one digit trunk access code as shown in the previous chapter **Dialing Plan** on page 13. The related **SIP Trunk Profile** will be described from page 17.



This examples **Off System Extensions** range **200-209** is set in accordance with the BRI trunks DNIS configuration.

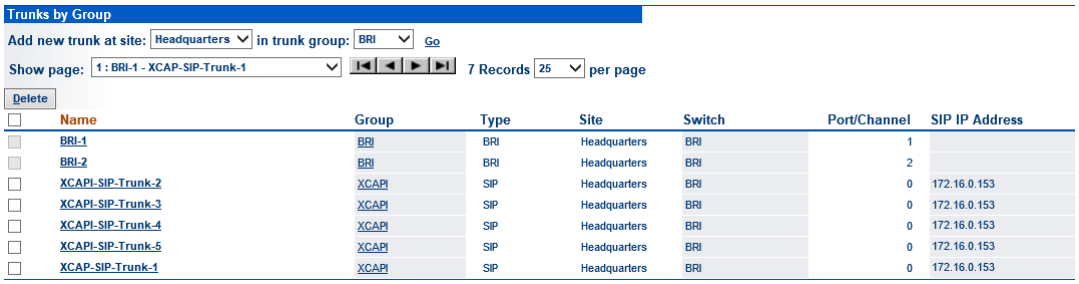


Please ensure that the dialing plan, access code, local area code and other numbering related configurations, match the customer VoIP environment. The numbering/dialing plan shown here is intended as an example.

3.8 Individual Trunks

Configure the required individual trunks after you have created the associated SIP trunk group.

Please note that a **ShoreWare SIP Trunk License** is required for appropriate SIP trunking, see chapter **License Requirements** starting on page 9.



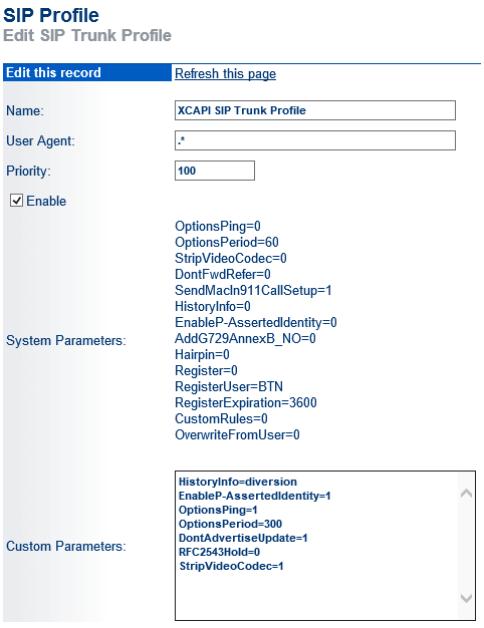
Name	Group	Type	Site	Switch	Port/Channel	SIP IP Address
BRI-1	BRI	BRI	Headquarters	BRI	1	
BRI-2	BRI	BRI	Headquarters	BRI	2	
XCAPI-SIP-Trunk-2	XCAPI	SIP	Headquarters	BRI	0	172.16.0.153
XCAPI-SIP-Trunk-3	XCAPI	SIP	Headquarters	BRI	0	172.16.0.153
XCAPI-SIP-Trunk-4	XCAPI	SIP	Headquarters	BRI	0	172.16.0.153
XCAPI-SIP-Trunk-5	XCAPI	SIP	Headquarters	BRI	0	172.16.0.153
XCAP-SIP-Trunk-1	XCAPI	SIP	Headquarters	BRI	0	172.16.0.153

3.9 SIP Trunk Profile

The XCAPI SIP trunk is assigned to its own SIP trunk profile.

Beside the **User Agent** and **Priority** values it is required to set some specific **Custom Parameters**. The parameter details can be reviewed in the ShoreTel document **SIP Trunks API For 3rd-Party Developers**. Please also check with the **Configuration Notes** starting on page 18 for their relevance.

The parameters are used as shown below for XCAPI interworking.

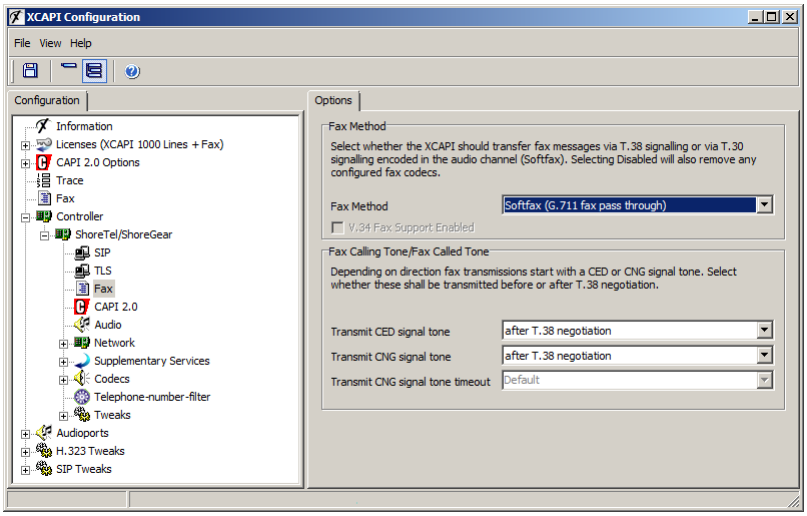


Configuration Notes

In these chapters you'll find some configuration hints and settings for supplementary services such as Softfax (via G.711), message waiting indication or call transfer. Such services are enabled by default for the XCAPI controller. For interworking those configurations should be checked as well as all the gateway related parameters.

4.1 Softfax

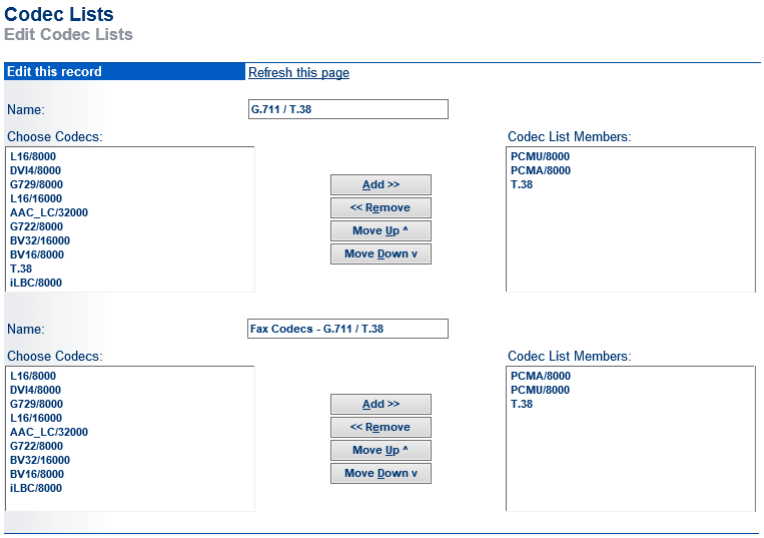
With the Softfax mode, the XCAPI simulates an analogue facsimile device by transmitting modulated facsimile-signals modem-like through the established G.711 audio channels.
For this please check the XCAPI controller configuration tab labeled **Fax** and ensure that **Softfax (G.711 fax pass through)** is selected as **Fax Method**. The required ShoreTel/ShoreGear codec lists has to be used as described in the previous chapter **Codec Lists** starting on page 11. In the case of multiple ShoreTel/ShoreGear **Sites**, conform codec list configurations are recommended.



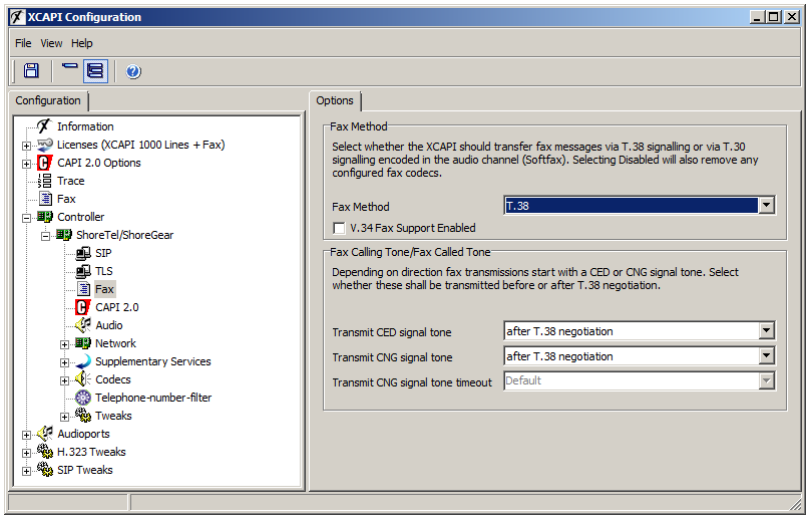
4.2 T.38

The codec lists have to include the G.711 codecs (at least one of them) and also the T.38 codec for appropriate codec negotiation. Assign the codec lists to **Intra-, Inter Site Calls** and **FAX and Modem Calls** within the ShoreTel **Site** configurations.

Please note that the Voice Switch types **ShoreGear 60/12**, **ShoreGear 120**, **ShoreGear T1**, **ShoreGear E1**, **ShoreGear 120/24** and **ShoreGear 24a** do not support any T.38 at all. Also check with the ShoreTel/ShoreGear documentation for T.38 related limitations and recommendations for fax support.



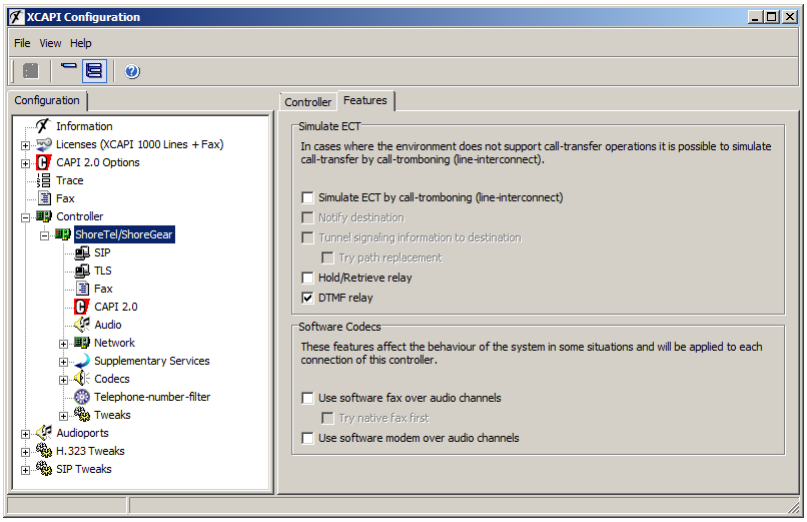
Also the XCAPI controller has to be set to the T.38 **Fax Method** as shown below.



4.3 Call Transfer

For enabling call transfer via SIP refer please ensure that the **Simulate ECT by call-tromboning (line-interconnect)** is disabled within the XCAPI controllers **Features** tab.

Ensure that **DontFwdRefer=0** is set to the according SIP trunk profile, as shown in the chapter **SIP Trunk Profile** starting on page 17.



4.4 Redirection Number

Several CAPI applications need to be given redirection numbers, in meaning of the gateway generated SIP diversion header, beside of the origins calling number.

For this the **HistoryInfo=diversion** custom parameter must be set to the according SIP profile, as shown in the chapter **SIP Trunk Profile** starting on page 17.
Additionally the SIP trunk group parameter **Enable Original Caller Information** must be set as shown in the chapter **Trunk Groups** starting on page 14.

Please note, XCAPI is also able to support **History-Info** header. On demand this can be evoked with setting up **HistoryInfo=history** for the ShoreTel/ShoreGear **SIP Trunk Profile**.

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This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).

This product includes software written by Tim Hudson (tjh@cryptsoft.com).

This product includes source code derived from the RSA Data Security, Inc. MD2, MD4 and MD5 Message Digest Algorithms.

This product includes source code derived from the RFC 4634 Secure Hash Algorithm software.

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